



Catch Basin Inserts for Ohio Roadways

BACKGROUND

The Ohio Department of Transportation (ODOT) is required to comply with the Ohio Environmental Protection Agency (Ohio EPA) Construction General Permit in order to discharge stormwater runoff following construction projects. ODOT is seeking cost effective alternatives to include in their stormwater BMP toolbox. This research assessed the viability of catch basin inserts (CBIs) as potential post-construction water quality BMPs to be added to ODOT's Location and Design Manual Vol.2 (L&D v2).

STUDY OBJECTIVE

The research was broken into two components—field testing and laboratory testing. The field testing was conducted to determine field performance and associated maintenance of CBIs in an ODOT curb-gutter roadway setting. The lab testing was conducted to determine the sediment removal efficiency of CBIs, compared to 80% sediment removal required by Ohio EPA.



This research provides ODOT with a third party-based evaluation of 8 vendor CBI type post-construction water quality products.

FIELD TESTING KEY FINDINGS

- Only one CBI could be installed in ODOT's standard CB-3A without modification.
- Five of the eight CBIs required replacement within seven months.

LAB TESTING KEY FINDINGS

- Two CBIs met the goal of 80% sediment retention.
- Seven of the eight CBIs did not create a watertight seal with the catch basin frame, allowing flows to bypass treatment.

RESEARCH APPROACH

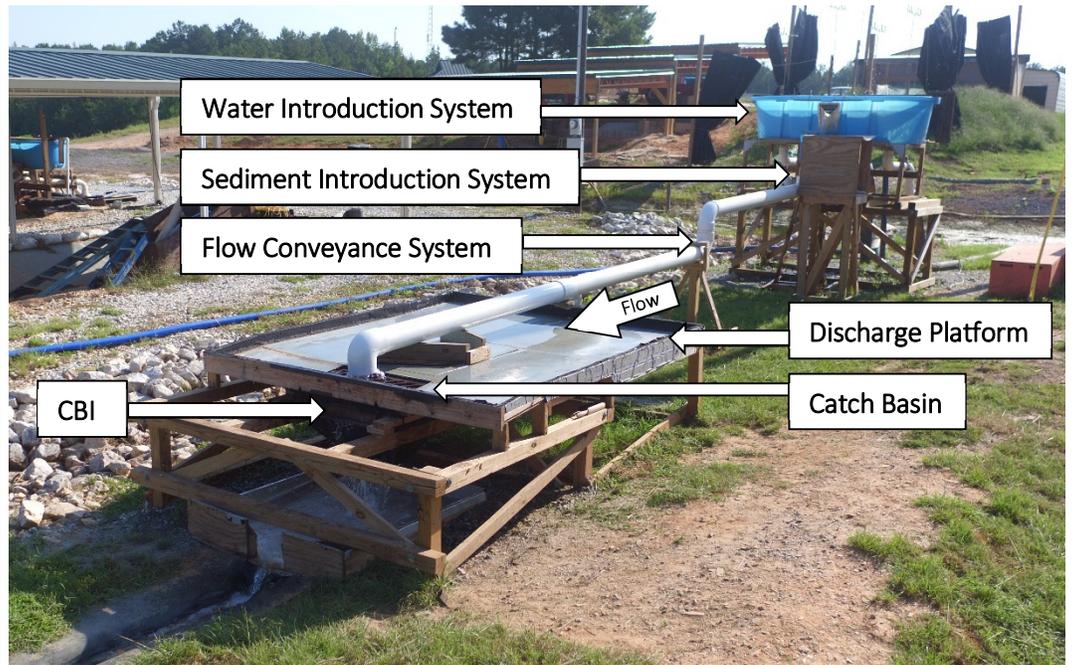
A literature review was conducted to identify the eight CBI products selected for the research, as well as the testing methods and approach.

The field testing installed the CBIs in CB-3As at two ODOT roadway locations. The CBIs were assessed on installation, maintenance, and replacement requirements for one year.

Laboratory testing exposed the CBI products to influent flow rates and durations to simulate typical field conditions. Using large-scale lab testing apparatus, CBIs were tested to determine sediment retention rates using TARP sandy loam and OK110 soil types under three separate flow rates. Longevity tests were also conducted to identify performance reduction when subjected to repeated tests.

LAB TESTING

A large-scale testing apparatus was constructed at Auburn University Erosion & Sediment Control Testing Facility to test the CBIs. The apparatus has the ability to test CBIs using different influent flow rates, soil types, load concentrations, and discharge methods, making the testing procedure representative of field-like conditions, while maintaining a controlled testing environment.



LAB RESULTS SUMMARY

Direct Discharge Tests at low flow rate (0.06 ft³/s)

Product Name	Sediment Retention OK110 Silica Sand	Sediment Retention TARP Sandy Loam Soil
Adsorb-It™	96.2	85.4
DrainPac™	79.8	68.1
FlexStorm®	71.3	65.4
Flo-Gard Plus®	10.4	24.7
Gullywasher©	67.1	51.7
Storm Sentinel©	71.3	41.6
Triton™	68.5	40.4
WQS	27.1	42.7

CONCLUSION

Since none of the units met both the sediment removal and installation requirements, and due to the high level of effort and cost to maintain, the CBIs tested do not appear to be a viable option to be added as post-construction stormwater BMPs within ODOT's L&D Manual v2. Of the eight CBI products tested, only the DrainPac™ and Adsorb-It™ met the goal of 80% sediment retention. However, only the Triton™ could be installed in ODOT's standard CB-3A without modification to prevent bypassing the CBI unit. This modification was allowed by ODOT for this study only, but would not otherwise be an acceptable practice. Lab testing showed most CBIs have internal bypasses during all flow rates (right) leading to low sediment retention or were easily clogged leading to system backups (above). To ensure CBIs are operating properly and hazardous conditions do not occur, CBIs must be frequently maintained and replaced.



To access the final report, visit the [ODOT Research](#) website.